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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,210	12/15/2003	Kazuhisa Takagi	402907	1815
23548	7590	02/09/2006	EXAMINER	
LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960			LEE, JOHN D	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding:

## Office Action Summary

Application No.

10/735,210

Applicant(s)

TAKAGI, KAZUHISA

Examiner

John D. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-8 and 11-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,3-8 and 12-14 is/are allowed.
- 6) ☒ Claim(s) 15 is/are rejected.
- 7) ☒ Claim(s) 11 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Applicant's amendment, filed on December 20, 2005, has been carefully considered by the Examiner. For the reasons explained by applicant in the "REMARKS/ARGUMENTS" section of the amendment, most of the pending claims are now allowable over the prior art of record. One rejection, however, must still be applied.

Claims 14 and 16 are objected to because of the following minor informalities. Appropriate correction is required. The first word of claim 14 ("the") should be capitalized. In line 3 of claim 16, there is no antecedent support for the term "the second diode". The appropriate term would be "the laser diode". Appropriate correction is required.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 15 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,282,015 to Ueno et al in view of U.S. Patent 6,646,784 to Leuthold. Claim 15 is newly presented and is much broader in scope than the remaining claims in the application. Ueno et al discloses, with respect to the prior art in Figure 1A thereof, the presence of an optical wavelength converter comprising essentially all the same elements as applicant's claimed converter. The prior art wavelength converter comprises an input-light splitter **27** for splitting an input phase-modulated light signal pulse at a first wavelength  $\lambda_1$  into first and second split light (light paths **28** and **29**); a continuous-wave light source (such as an injection laser diode) **21** at a second wavelength  $\lambda_2$  into which is also split (at **23**) into first and second split light; a Mach-Zehnder interferometer

containing nonlinear portions **24** and **25**, one in each arm of the interferometer; and an output coupler **30** for outputting an output phase-modulated light signal pulse at the second wavelength  $\lambda_2$ . Although the description in Ueno et al does not use the same terminology set forth in applicant's claims, the person of ordinary skill in the art would obviously have known and understood that the Mach-Zehnder interferometer of the prior art wavelength converter operates as a "multiplex interference portion" to multiplex-interfere the first and second split lights (both from the input signal pulse and from the continuous-wave light source). The person of ordinary skill in the art would further have known and understood that the Mach-Zehnder interferometer of the prior art wavelength converter (because of the non-linear elements in the arms thereof) performs a cross-phase modulation of the continuous-wave light at wavelength  $\lambda_2$  and the signal pulse light at wavelength  $\lambda_1$ ). The output signal pulse is thus a phase-modulated pulse like that of the input signal pulse but at a converted wavelength  $\lambda_2$ . The optical wavelength converter of the above-identified claim would therefore have been obvious over that of Ueno et al Figure 1A since, as just explained, the Mach-Zehnder interferometer of the reference is equivalent to the claimed "multiplex-interference portion" and "phase modulation portion" broadly stated in the claims. Notice also that, in Ueno et al Figure 1A, one of the split light paths is delayed with respect to the other. The amount of delay (e.g. a one-bit delay or less than a one-bit delay) would obviously be chosen by the practitioner in accordance with the particular application in which the wavelength converter is being used. Although such delay occurs just prior to the Mach-Zehnder interferometer in the reference, the effect is the same as if the delay occurred within the interferometer (i.e. in one of the two interferometer paths). Having the split light path delay within the Mach-

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Zehnder interferometer of Ueno et al would thus have been obvious to a person of ordinary skill in the art. In the Ueno et al Figure 1A wavelength converter, the nonlinear portions 24 and 25 are implemented as nonlinear waveguide segments. The use of other nonlinear elements for performing cross-phase modulation in similar optical wavelength converters is well known in the art, however. For instance, Leuthold teaches using semiconductor optical amplifiers for this purpose. The use of semiconductor optical amplifiers as the nonlinear portions 24 and 25 in the Ueno et al Figure 1A wavelength converter would thus have been obvious to the person of ordinary skill in the art.

Claims 11 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Ueno et al, the closest prior art document of record, does not disclose or suggest an optical circulator in the phase modulation portion as set forth in dependent claim 16. Ueno et al also does not disclose or suggest the use of an optical bistable device for generating intensity-modulated light in the manner set forth in claim 11.

Claims 1, 3-8, and 12-14 are allowable over the prior art of record. The reasons are clearly explained by applicant in the "REMARKS/ARGUMENTS" section of the December 20, 2005, amendment.

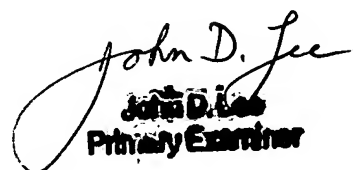
Applicant's arguments submitted with the response of December 20, 2005, have been considered but they are not deemed to be persuasive with respect to newly presented claim 15. As mentioned earlier, this newly presented claim is much broader in scope than the remaining claims in the application, and applicant has offered no explanation at

all as to why it is distinct from the prior art. As clearly explained in the rejection above, the Examiner believes that it is not distinct.

Applicant's amendment necessitated the new ground(s) of rejection set forth herein (i.e. the presentation and subsequent rejection of a new broader claim). Accordingly, **THIS ACTION IS MADE FINAL**. Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE (3) MONTHS from the mailing date of this action. In the event a first reply is filed within TWO (2) MONTHS of the mailing date of this final action and an advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 C.F.R. § 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX (6) MONTHS from the mailing date of this action.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.

  
John D. Lee  
Primary Examiner